Storm Water Management Program

November 9, 2015

HRGreen

Phase I: Storm Water Needs Assessment
Ladue, Saint Louis County, Missouri

REPORT of FINDINGS – EXECUTIVE SUMMARY

The report presents a summary of the storm water needs for the City of Ladue, Saint Louis County, Missouri. The objective of the "Needs Assessment" is to identify storm water related problems city-wide including the "health" of the natural streams.

A problem classification system was established that gives the highest priority to storm water problems that impact public infrastructure and to chronic problems. The lowest priority is given to storm water problems that are located within the mapped floodplain regulated by FEMA and to acute problems. The problem categories are:

- Chronic Flooding Group (greater than or equal to a 50% (1-in-2) chance of occurrence)
- Frequent Flooding Group (less than a 50% (1-in-2) but greater than or equal to a 6.66% (1-in-15) chance of occurrence)
- Infrequent Flooding Group (less than a 6.66% (1-in-15) chance of occurrence)
- Erosion Group
- Nuisance Flooding

The problem categories are further broken down in the report. The report also details the data gathering process followed. The City's GIS Database is the repository for the problem point data collected.

An exploratory survey of approximately 21-miles of Deer Creek Watershed stream channel was conducted to assess geomorphological features. Approximately 12-miles qualify as a natural channel. The channels assessed are generally in fair condition with the median score just above average. An exploratory survey of approximately 3-miles of the Deer Creek channel was also conducted to identify problem points only. A total of 52-problem points were identified from both surveys.

A hydrologic/hydraulic study of Ladue's conveyance system was performed. Study results estimate flowrates in the system to range from just under 3-cfs to approximately 15,100-cfs. The maximum estimated channel velocity is approximately 14-fps. In all, 96 out of 186, or 52%, of the open channel segments have an estimated maximum velocity over 5-fps, which is an indication of potential instability and erosion. Similarly, 64 out of 112, or 57%, of the culvert and pipe conduit links surcharge at a 1:15 chance frequency rainfall event. In general, a 1:15 chance rainfall event is the required storm used by MSD to design storm water drainage facilities within the City of Ladue. Under those criteria, 64 culverts are identified as capacity deficient.

Problem point data collected was combined with record complaint data from MSD and the City of Ladue in GIS and statistically analyzed. Over 1,000 problem points in the database were analyzed. The algorithm used to do the analysis evaluates the frequency, density, severity, and priority of the problem points then arranges those

into logical groups geographically. The result is the identification of "hot spots" within the Ladue study area. A density map was then produced that shows the variation of problem point severity by color differentiation. For the purposes of this study, the colors range from red (most severe) to yellow (medium) to green (least severe). The areas in red represent the locations that statistically have the greatest need. Refer to the attached "Weighted Problem Point Density Map".

The following neighborhoods/areas are the locations in Ladue that statistically have the greatest need:

- Prado/La Hacienda
- Babler Lane
- Overbrook Drive
- Conway Road
- South Tealbrook Drive
- Foxboro
- Deer Creek Subdivision
- Willow Hill
- Briarcliff
- Park Lane
- Clermont/Dogwood/Clerbrook
- Godwin Lane
- Louwen/Wenlou/St. Mary's Knoll/Wenneker
- Log Cabin Drive
- Briarwood Subdivision
- Upper Ladue Road
- Sunnymeade

Consult the report for the following lists:

- Ten top ranked stream channel segments with the worst geomorphology
- Twelve top ranked isolated stream channel erosion problems
- Fourteen top ranked public culvert and pipe surcharging locations
- Twenty-five top ranked private culvert and pipe surcharging locations
- Sixty-nine top ranked stream channels with high velocity in a high frequency storm event

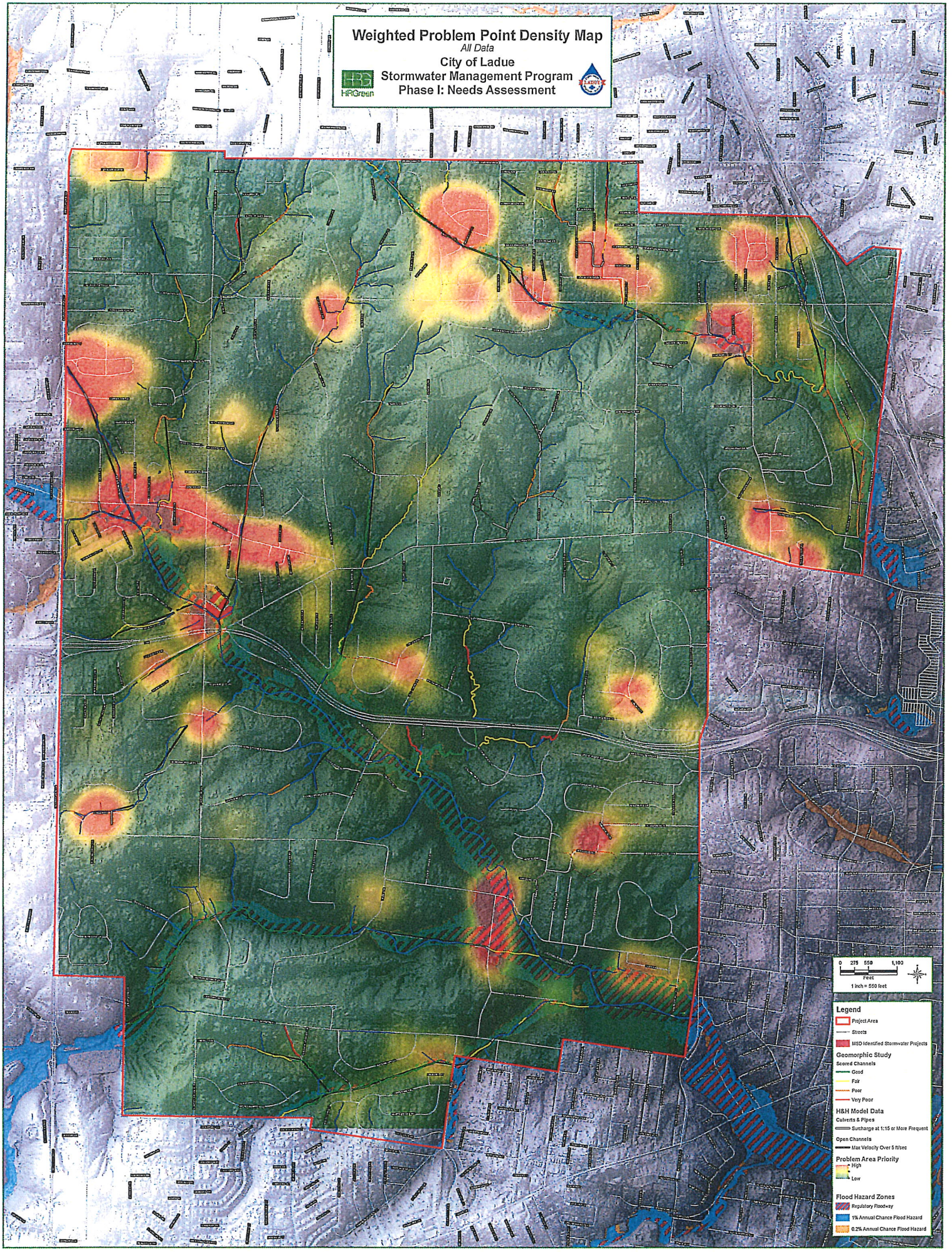
MSD has conceptual/preliminary studies completed for twenty projects in the City of Ladue. Five are "scheduled" projects; fifteen are "unscheduled". The following is a list of scheduled projects. The total dollar amount budgeted for these projects is $1,462,000.

- Conway-Clerbrook Storm Channel
- Forcee Lane Storm Sewer
- Park Lane #9568 - #9572 Storm Sewer
- Picardy Lane Subdivision Bank Stabilization
- Maryhill Drive Storm Sewer

The following is a list of unscheduled projects. The total dollar amount budgeted for these projects is $20,634,000.

- Black Creek #12
- Tirrill Farms Storm Sewer
- Clermont Lane Storm Sewer
- Conway Lane – Conway Road Bridge and Channel Improvements
- Godwin – Ladue Crest Storm Sewer
- Foxboro Road Flood Mitigation
- Conway Road #10134 Storm Sewer
- Cella Road Storm Sewer
- Babler Lane to Winding Ridge Storm Sewers
- Warson Road S. #215 Bank Stabilization
- Watch Hill Road #5 Bank Stabilization

- Wakefield – Deerfield to Litzinger Sinkhole Relief Sewer
- Log Cabin Drive Storm Sewer
- Prado Storm Sewer Improvements
- Briarwood Drive Streambank Stabilization


Weighted Problem Point Density Map
All Data
City of Ladue
Stormwater Management Program
Phase I: Needs Assessment
HRGreen
0 275 550 1,100
Feet
1 inch = 550 feet
Legend
Project Area
Streets
MSD Identified Stormwater Projects
Geomorphic Study
Scored Channels
Good
Fair
Poor
Very Poor
H&H Model Data
Culverts & Pipes
Surcharge at 1:15 or More Frequent
Open Channels
Max Velocity Over 5 ft/sec
Problem Area Priority
High
Low
Flood Hazard Zones
Regulatory Floodway
1% Annual Chance Flood Hazard
0.2% Annual Chance Flood Hazard